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SPECIFICATION FOR WORSTED GABERDINE, KHAKI, DRAB

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TO

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Corrigendum

(*Page 9, clause 8.4, informal table, under the column 'Criteria for Conformity'*):

a) *Against Sl No. 3* - Substitute '$\overline{X} - 0.4R \geqq$ specified value' *for* '$\overline{X} - 0.4R$ specified value'.

b) *Against Sl No. 4* - Substitute '$\overline{X} + 0.4R \leqq$ specified value' *for* '$\overline{X} + 0.4R <$ specified value'.

c) *Against Sl No. 6* - Substitute '$\overline{X} - 0.4R \geqq$ specified value' *for* '$\overline{X} - 0.4R >$ specified value'.

(TDC 4)

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(*Continued on page* 2)

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SPECIFICATION FOR WORSTED GABERDINE, KHAKI, DRAB

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 16 January 1978, after the draft finalized by the Wool and Wool Products Sectional Committee had been approved by the Textile Division Council.

0.2 The cloth covered by this standard is a superior quality worsted fabric having predominance of upright warp twill. In the manufacture of this cloth, *imported* wool shall be used.

0.3 Assistance has been derived in the formulation of this standard from IND/TC/1199 (h) 'Gaberdine, worsted, khaki, drab', issued by the Ministry of Defence.

0.4 To familiarize the industry with International System of units (SI units) the basic SI units as well as the recommended SI units for use in the textile industry are given in Appendix A.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the constructional particulars and other requirements of worsted gaberdine, khaki, drab.

1.2 This standard does not specify the indeterminable characteristics like general appearance, feel, finish and shade of cloth (*see also* **4**).

---

*Rules for rounding off numerical values (*revised*).

2. MANUFACTURE

2.1 The particulars regarding the grade of wool top, count of yarn, weave and finish for the manufacture of cloth are given in Table 1. The slubbing shall be dyed before spinning the yarn. If facilities for the same are not available, the cloth may be piece dyed if agreed to between the buyer and the seller.

TABLE 1 MANUFACTURING PARTICULARS OF WORSTED GABERDINE, KHAKI, DRAB

Fineness Grade of Wool Tops*	Approximate Count of Basic Yarn† [Universal Count (Metric Count)]		Weave	Type of Finish
	Warp	Weft		
64^S	22 tex × 2 (Nm 45/2)	38 tex or 19 tex × 2 (Nm 26 or Nm 52/2)	2/1 Twill	Clear-cut

*For determination of fineness grade of wool tops, reference may be made to IS : 5911-1977 ' Fineness grades of wool tops (*first revision*) '.

†Yarn shall be spun on worsted system. The count of yarn is given only for guidance of manufacturer.

2.2 Cloth — The cloth shall be clean scoured and shall be free from grease, soap or any other admixture which might give it a fictitious weight, substance or firmness.

2.2.1 The cloth shall be uniformly woven with firm selvedges.

2.2.2 The cloth may be rendered moth-proof with dichlorodiphenyl trichloroethane (DDT) or otherwise heavily preserved with naphthalene.

Note — The manufacturer shall declare whether the cloth has been rendered moth-proof or not.

2.2.3 The cloth, when visually examined against light and on a flat surface, shall not have more than 12 objectionable flaws in a full length piece. However, in 25 percent of the pieces in the lot, up to a maximum of 16 objectionable flaws per piece shall be permitted. The objectionable flaws shall be those which strike immediately the eyes of the person examining the cloth and shall be deemed to include:

a) missing ends and picks;
b) floats;
c) cuts and holes;
d) stains;
e) weft bars and warp section marks;
f) big slubs, knots and specks;
g) dyeing defects (stracks, patches); and
h) thick and thin places.

2.2.3.1 All objectionable flaws shall be marked by means of a thread of a contrasting shade sewn in the selvedge opposite the flaw. An allowance of 10 cm shall be given for each flaw up to 12 flaws in the piece. However, in case of pieces having flaws exceeding 12 and up to 16, an allowance of 25 cm for each such flaw shall be given.

2.2.3.2 A reference may be made to IS : 4125-1967* for details of these flaws.

3. REQUIREMENTS

3.1 The constructional particulars of the cloth shall conform to those given in Table 2.

TABLE 2 CONSTRUCTIONAL PARTICULARS OF WORSTED GABERDINE, KHAKI, DRAB

	Ends/cm	Picks/cm	Mass	Breaking Load on 15 × 20 cm Strips (Cut-Strip Method), *Min*		Length (*see* Note)	Width (Exclusive of Selvedges), *Min*
				Warp*	Weft*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
			g/m^2	N	N	m	cm
	35	20	270	1 300	500 (in case of single yarn) or 700 (in case of two-fold yarn)	40 to 60	142 or as agreed
Tolerance, Percent	±5	±5	±5	—	—	—	—
Method of Test	IS : 1963-1969†	IS : 1963-1969†	IS : 1964-1970‡	IS : 1969-1968§	IS : 1969-1968§	IS : 1954-1969‖	IS : 1954-1969‖

Note — Short length pieces measuring not less than 10 metres shall be permissible subject to a maximum of 5 percent pieces in the lot.

*1 N (newton) is approximately equal to 0·102 kgf.

†Methods for determination of threads per decimetre in woven fabrics (*first revision*).

‡Methods for determination of weight per square metre and weight per linear metre of fabrics (*first revision*).

§Method for determination of breaking load and elongation at break of woven textile fabrics (*first revision*).

‖Methods for determination of length and width of fabrics (*first revision*).

---

*Glossary of terms pertaining to defects in fabrics.

3.2 The other requirements of cloth shall conform to those given in Table 3.

TABLE 3 REQUIREMENTS OF WORSTED GABERDINE, KHAKI, DRAB

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST
(1)	(2)	(3)	(4)
i)	Colour fastness to:		
	a) Light (*see* Note)	5 or better	IS : 686-1957* or IS : 2454-1967†
	b) Washing	4 or better	IS : 3361-1965‡
	c) Dry cleaning	4 or better	IS : 4802-1968§
ii)	Relaxation shrinkage, percent, *Max*		IS : 665-1962‖
	a) Warpway	5·0	
	b) Weftway	4·0	
iii)	*p*H value of aqueous extract	5·0 to 7·5	Hot method of IS : 1390-1961¶
iv)	DDT, percent, *Min*	0·3	IS : 3522 (Part II)-1970**
v)	Ether-soluble matter, percent, *Max*	1·0	IS : 4390-1967††

NOTE — In case of dispute, colour fastness to light shall be determined by the method prescribed in IS : 686-1957*.

*Method for determination of colour fastness of textile materials to daylight.

†Method for determination of colour fastness of textile materials to artificial light (xenon lamp).

‡Method for determination of colour fastness of textile materials to washing: Test 2.

§Method for determination of colour fastness of textile materials to dry cleaning.

‖Method for determination of relaxation shrinkage of woven fabrics containing wool.

¶Methods for determination of *p*H value of aqueous extracts of textile materials.

**Method for estimation of common preservatives used in textile industry, Part II.

††Method for determination of ether-soluble matter in textile materials.

4. SEALED SAMPLE

4.1 If, in order to illustrate or specify the general appearance, feel, shade and finish, etc, of cloth a sample has been agreed upon and sealed, the supply shall be in conformity with the sample in such respects.

4.1.1 The custody of the sealed sample shall be a matter of prior agreement between the buyer and the seller.

5. MARKING

5.1 The cloth shall be marked with the following:

a) Name of the material;

b) The legend 'All Wool' (*see* Note);

c) Manufacturer's name, initials or trade-mark;

d) Month and year of manufacture; and

e) Length and width of the piece.

NOTE — A reference may be made to IS : 1793-1973* for the application of this term.

5.1.1 The cloth may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

6. PRESERVATION

6.1 If the cloth has not been rendered moth-proof, the same shall be packed with a heavy dose of naphthalene, that is with a minimum quantity of five kilograms per cubic metre of the volume of the bale or case.

7. PACKING

7.1 The cloth shall be packed in bales or cases in conformity with the procedure laid down either in IS : 32-1971† or in IS : 741-1971‡ as required.

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*Guide for marking textile materials made of wool (*first revision*).

†Code for seaworthy packaging of woollen and worsted yarn and cloth (*second revision*).

‡Code for inland packaging of woollen and worsted yarn and cloth (*first revision*).

7.2 Alternatively, the cloth may be packed according to the details given below when specifically agreed to between the buyer and the seller:

> Each piece of cloth shall be suitably folded in a rectangular form or wrapped on cardboard or strawboard of suitable size and thickness. Each piece then shall be wrapped with polyethylene film of minimum 40 microns thickness or alternatively kraft paper. The edges of the kraft paper or polyethylene film shall be gummed or sealed. Alternatively, each piece may be tied with twine at least at two places. Such pieces, in a suitable number, shall then be covered in a layer of heavy cee jute cloth preferably conforming to IS : 3751-1966* to form compact bales. The bales shall be made secure by cross hooping the steel strips at right angles to both the length and the width of the bale. The gross weight of the bale shall not normally exceed 200 kg. All packing materials shall conform to IS : 741-1971†.

8. SAMPLING AND CRITERIA FOR CONFORMITY

8.1 Lot — The quantity of cloth delivered to one buyer against one despatch note shall constitute a lot.

8.2 The conformity of a lot to the requirements of the standard shall be determined on the basis of the tests carried out on the samples selected from the lot.

8.3 Unless otherwise agreed to between the buyer and the seller, the number of pieces to be selected at random shall be in accordance with col 1 and 2 or col 1 and 4 of Table 4. To ensure randomness of selection IS : 4905-1968‡ may be used.

TABLE 4 SAMPLING SIZE AND CRITERIA FOR CONFORMITY

(*Clauses* 8.3 *and* 8.4)

LOT SIZE	SAMPLE SIZE	PERMISSIBLE NUMBER OF NON-CONFORMING PIECES	SUB-SAMPLE SIZE
(1)	(2)	(3)	(4)
Up to 50	5	0	2
51 „ 150	8	0	3
151 „ 300	13	1	3
301 „ 500	20	1	5
501 and above	32	2	5

---

*Specification for heavy cee cloth.

†Code for inland packaging of woollen and worsted yarn and cloth (*first revision*).

‡Methods for random sampling.

8.4 Number of Tests and Criteria for Conformity

Characteristics	*Number of Tests*	*Criteria for Conformity*
1. General appearances, finish, weave objectionable flaws, ends, picks, mass, and width	According to col 2 of Table 4	Permissible number of non-conforming pieces not to exceed the corresponding number given in col 3 of Table 4
2. Length	According to col 2 of Table 4	Length of each piece not to measure less than the specified, declared or marked length
3. Breaking load	According to col 4 of Table 4	$\bar{X} - 0{\cdot}4\ R$ specified value
4. Relaxation shrinkage	do	$\bar{X} + 0{\cdot}4\ R <$ specified value
5. *p*H value	do	$\bar{X} \pm 0{\cdot}4\ R$ lie within the specified requirements
6. DDT	do	$\bar{X} - 0{\cdot}4\ R >$ specified value
7. Colour fastness and ether-soluble matter	do	All the test specimens satisfy the relevant requirements
8. Fineness grades of wool tops	do	A composite test specimen prepared from the number of pieces given in col 4 of Table 4 satisfy the relevant requirements

$\bar{X}$ = Average value obtained by dividing the sum of the observed values by the number of test results.

R = Range, that is difference between the maximum and the minimum in a set of observed values.

APPENDIX A

(*Clause* 0.4)

SI UNITS

TABLE 5 INTERNATIONAL SYSTEM OF UNITS

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	CONVERSION
Force	newton	N	1 N = 0·101 972 kgf
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

TABLE 6 RECOMMENDED SI UNITS FOR TEXTILES

SL No.	CHARACTERISTIC	SI UNIT		APPLICATION
		Unit	Abbreviation	
(1)	(2)	(3)	(4)	(5)
1.	Length	Millimetre	mm	Fibres
		Millimetre, centimetre	mm, cm	Samples and test specimens (as appropriate)
		Metre	m	Yarns, ropes and cordages, fabrics
2.	Width	Millimetre	mm	Narrow fabrics
		Centimetre	cm	Other fabrics
		Millimetre, centimetre	mm, cm	Samples and test specimen (as appropriate)
		Centimetre, metre	cm, m	Carpets, druggets, durries (as appropriate)
3.	Thickness	Micrometre (micron)	µm	Delicate fabrics
		Millimetre	mm	Other fabrics, carpets, felts
4.	Linear density	Tex	tex	Yarns
		Millitex	mtex	Fibres
		Decitex	dtex	Filament and filament yarns
		Kilotex	ktex	Slivers, ropes and cordages
5.	Diameter	Micrometre (micron)	µm	Fibres
		Millimetre	mm	Yarns, ropes, cordages
6.	Circumference	Millimetre	mm	Ropes, cordages
7.	Threads in cloth:			
	a) Length	Number per centimetre	ends/cm	Woven fabrics (as appropriate)
		Number per decimetre	ends/dm	
	b) Width	Number per centimetre	picks/cm	
		Number per decimetre	picks/dm	
8.	Warp threads in loom	Number per centimetre	ends/cm	Reeds
9.	Stitches in cloth:			
	a) Length	Number per centimetre	courses/cm	Knitted fabrics (as appropriate)
		Number per decimetre	courses/dm	
	b) Width	Number per centimetre	wales/cm	
		Number per decimetre	wales/dm	

(*Continued*)

TABLE 6 RECOMMENDED SI UNITS FOR TEXTILES — *Contd*

Sl No.	Characteristic	SI Unit		Application
		Unit	Abbreviation	
(1)	(2)	(3)	(4)	(5)
10.	Stitch length	Millimetre	mm	Knitted fabrics Made-up fabrics
11.	Mass per unit area	Grams per square metre	g/m^2	Fabrics
12.	Mass per unit length	Grams per metre	g/m	Fabrics
13.	Twist	Turns per centimetre Turns per metre	turns/cm turns/m	Yarns, ropes (as appropriate)
14.	Test or gauge length	Millimetre, centimetre	mm, cm	Fibres, yarns and fabric specimens (as appropriate)
15.	Breaking load	Millinewton	mN	Fibres, delicate yarns (skeins or individual)
		Newton	N	Strong yarns (individual or skeins), ropes and cordages, fabrics
16.	Breaking length	Kilometre	km	Yarns
17.	Tenacity	Millinewton per tex	mN/tex	Fibres, yarns (individual or skeins)
18.	Twist factor or twist multiplier	Turns per centimetre × square root of tex Turns per metre × square root of tex	$\text{turns/cm} \times \sqrt{\text{tex}}$ $\text{turns/m} \times \sqrt{\text{tex}}$	Yarns (as appropriate)
19.	Bursting strength	Newton per square centimetre	N/cm^2	Fabrics
20.	Tear strength	Millinewton Newton	mN N	Fabrics (as appropriate)
21.	Pile height	Millimetre	mm	Carpets
22.	Pile density	Mass of pile yarn in grams per square metre per millimetre pile height	g/m^2/mm pile height	Pile carpet
23.	Elastic modulus	Millinewton per tex per unit deformation	mN/tex/ unit deformation	Fibres, yarns, strands

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